

Open Research Online

The Open University's repository of research publications
and other research outputs

Pixels or plasticine: evoking curiosity to engage children with data

Conference or Workshop Item

How to cite:

Wolff, Annika; Petre, Marian and van der Linden, Janet (2017). Pixels or plasticine: evoking curiosity to engage children with data. In: Designing for Curiosity workshop at CHI 2017, 7 May 2017, Denver, Colorado.

For guidance on citations see [FAQs](#).

© [\[not recorded\]](#)

Version: Version of Record

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Pixels or plasticine: evoking curiosity to engage children with data

Annika Wolff

The Open University
Milton Keynes, MK7 6AA
Annika.wolff@open.ac.uk

Marian Petre

The Open University
Milton Keynes, MK7 6AA
m.petre@open.ac.uk

Janet van der Linden

The Open University
Milton Keynes, MK7 6AA
Janet.VanDerLinden@open.ac.uk

Author Bios

Annika Wolff is a researcher in Human-Data interaction with a focus on playful and tangible interactions with data to engage learners and teach data literacy from complex data sets. *Marian Petre* is a Professor of Computing whose research addresses representation and reasoning, design, new forms of interaction, and expertise. *Janet van der Linden* is a Professor of Interaction Design whose research is concerned with physical computing for creativity and co-designing technologies with people with sensory impairments.



Figure 1. Aerial obtained data showing potential for houses to generate solar energy

Pixels or plasticine

'Pixels or plasticine' took complex data collected from smart city research into school and used it to teach data skills to thirteen 10-year-old students. Contributing to teaching about renewable energy, the activities engaged children with data that showed roofs in a UK town, allowing the children to reason about different buildings' potential for generating solar energy. The data was collected using LiDAR technology during an aerial survey of the region (figure 1).

The study followed an inquiry-based approach, encouraging students to pose questions from the data that interest them and whose answers they are therefore curious to know. As highlighted by Pluck and Johnson [2], this aligns with Loewenstein's information-gap theory [1]. Two sessions were conducted to try to see if there were any differences in learners' interactions with (and responses to) data experienced through different modalities, first using a screen-based interface (the pixel approach) and second by constructing a model themselves (the plasticine approach).

The pixel approach

In the first activity, students interacted with this data on a screen (Figure 2). We observed that, after



Figure 2. Screen-based engagement



Figure 3. Physical engagement

interacting for a short while with the data, students would begin to ask questions, such as hypothesizing that a certain building that they knew (their school, a local landmark, their house) would be a good or bad candidate for solar panels. They would make the hypothesis, then search the map to verify the answer. The students could (and did) make the connection between the data and their own environment, e.g., looking for their own houses. However, they did not express any concerns about privacy, or question the validity of the data in any way.

The plasticine approach

In the plasticine house task, students were asked to build a house themselves out of plasticine and then recreate the process of collecting the data by LiDAR, effectively becoming the measuring instrument from a 'bird's eye' view of their little house (figure 3). In this way, the data came 'off the screen'. Students worked in groups. They drew a grid on their house and the surrounding landscape and measured the height of each square to recreate the LiDAR readings. Through this, they learned about the importance of data resolution, based on how big or small they drew their square and how this affected accuracy. But of real interest was, first, the way in which their questions changed about the data and their response to it, and second in their *interaction* with the data.

- Students started to ask questions about the *accuracy* of data collected this way. They could more easily perceive possible sources for error and wondered what they would now find from the screen-based data.
- They made a better *connection* between the datasets and their own lives, realizing that a plane must have flown above their house at some point to

collect the data. One student described this as 'spooky' and then became curious about other data that might exist, about which they didn't know.

- Finally, a clear difference between the screen-based task and the plasticine task was in students' interactions with the different interfaces. In Figure 2, students are standing back and pointing, whereas in Figure 3, it can be seen that many students are leaning in to try to touch the plasticine, though this provided no additional information that they needed. This observation was common across groups. It would be interesting to study at a later date whether touching was helping them to formulate questions, satisfy their curiosity, keeping them better engaged with the task, or possibly even a distraction (although observationally, this did not appear to be the case, as conversations were very much 'on task').

Some findings would need to be more formally studied, not least eliminating order effects by conducting the activities in the alternative order of presentation. Overall, though, these activities suggest that tasks such as this can evoke curiosity and a desire for learners to find out an answer, but that the modality may affect the focus of learners' curiosity. The study does not find answers to this, but highlights possible future research areas.

References

1. Loewenstein, G., 1994. The psychology of curiosity: A review and reinterpretation. *Psychological bulletin*, 116(1), p.75.
2. Pluck, G. and Johnson, H.L., 2011. Stimulating curiosity to enhance learning. *GESJ: Education Sciences and Psychology*, 2.